INTERMOUNTAIN POWER SERVICE CORPORATION

July 15, 2010

Cheryl Heying, Director
Utah Division of Air Quality
Department of Environmental Quality
195 North 1950 West
P.O. Box 144820
Salt Lake City, UT 84114-4820

Attention: PSD/NSR Permitting Section

Dear Director Heying:

Notice of Intent: Replacement of Emissions Unit at Intermountain Power Project

Intermountain Power Service Corporation (IPSC) is hereby submitting a Notice of Intent (NOI) for approval, if required under Utah rules, of replacement of emission units at the Intermountain Convertor Station (ICS) in Delta. The ICS is a combination switchyard and an AC to DC converter station taking and sending electric power from and to several entities. The ICS is co-located with the Intermountain Generating Station (IGS), a coal fired steam-electric plant located in Millard County, but is under different operating oversight. IPSC is replacing non-combustion related cooling towers used to reject heat generated from converting alternating current to direct current (AC/DC) for transmission of power to southern California.

As required by Utah Administrative Code R307-401-5(2), the following information is provided:

1. **PROCESS DESCRIPTION:** The Intermountain Converter Station (ICS) receives and sends power across several transmission systems interconnecting Utah, Nevada, and California entities. The ICS is the northern terminus of the Intermountain Power Project's (IPP) Southern Transmission System (STS), which links southern California electrically with central Utah.

   Power is also conveyed across the Northern Transmission System (NTS) which ties the ICS to other Utah and Nevada power sources over three AC transmission lines. The NTS consists of two 50-mile, 345 kilovolt AC transmission lines to the Mona Substation, near Mona, Utah; and a 144-mile, 230 kilovolt AC transmission line to the Gonder Substation near Ely, Nevada.

   The final connection with the ICS switchyard and convertor station is the exclusive tie-in with the Milford Wind Farm project, 75 miles south of IPP.

   The Southern Transmission System (STS) consists of two 490-mile, +/-500Kv high voltage direct current (HVDC) transmission lines with a converter station at

850 West Brush Wellman Road, Delta, Utah 84624 / Telephone (435) 864-4414 / FAX (435) 864-6670 / Fed I.D. #87-0388573

each end. The STS conveys electric power between the Intermountain Generating Station and the Adelanto Convertor Station in southern California.

Power systems throughout the nation primarily operate on AC electricity. However, the DC method of transmission is a more economic process for moving large amounts of electric energy over long distances. More importantly, an HVDC transmission systems provide greater control of grid power flow.

The ICS changes the AC power, generated at various sources, into DC power for transmission to the converter station at Adelanto (and vice versa). The Adelanto Converter Station then changes the DC power back to AC power for distibution to southern California participants.

Thyristor converter valves are the heart of the two converter stations on the HVDC system. The thyristor valve is a solid-state rectifier/inverter. It converts AC power to DC power for transmission over the STS to the station at the other end, and then converts the DC power back to AC for transmission over the interconnected AC network.

The process of converting electricity from AC to DC (and vice versa) generates heat. This heat is rejected via a two-cycle cooling system. The closed cycle cooling system removes heat directly from the thyristor valves, and transfers the heat to an open circulating system through non-contact heat exchangers. The open cycle cooling system rejects heat through contact counterflow cooling towers. The replacement of these towers is the reason for this NOI.

The ICS is staffed and maintained by Intermountain Power Service Corporation personnel. The rest of the STS is maintained by the Los Angeles Department of Water & Power (LADWP). The entire STS is directly dispatched under the control of the LADWP Energy Control Center (ECC), based upon the available energy portfolio from all electric sources.

PRODUCTION SUMMARY: The ICS operates on a 24-hour per day/7-day per week continuous basis, 8,760 hours per year.

The rated power for the ICS has been 1920 MW at ±500 kV DC. An upgrade to 2400 MW is in process. The STS is being upgraded to more reliably handle the load increase in transmission of green power to southern California. Specifically, the addition of electrical load from the Milford wind farm could affect stability and power quality of the STS without this upgrade.

The portion of the upgrade for which IPSC is seeking review consists of the replacement of six cooling towers with eight cooling towers, along with associated piping. Two heat exchangers tying the closed cycle with the open cycle are also part of the upgrade, but are not emission sources. The existing

pumps and cooling system peripheral equipment will remain the same since they have sufficient capacity for the new towers. The open cooling system flow rate will change, for purposes of emission calculations, due to the new tower design. The old towers have flow capacities of 675 gpm each. The new towers have better heat rejection efficiencies with flow capacities of 445 gpm each, requiring less total flow. Hence, no increase in emissions are expected from the upgrade.

The open cooling system utilizes sulfuric acid for pH control, and biocide for control of organic fouling. No chromium-based treatment is used. The system is a recirculating heat rejection system only, emitting water vapor drift with no combustion products. Some TDS related particulate matter associated with the drift may be emitted.

ICS Data	Previous	New
Commissioning Year:	1986	2010 (upgrade)
Power Rating:	1,920 MW	2,400 MW
No. of Poles:	2	2
AC Voltage:	345 kV	345 kV
DC Voltage:	±500 kV	±500 kV
No. of Cooling Towers:	6	8
Cooling Water Flow Rate: (Per Pole)	2,025 gpm	1,780 gpm
Max TDS:	1,500 ppm	1,500 ppm
Drift Factor:	0.002%	0.002%

Note: Cooling tower design flow capacities and maximum TDS limits set by manufacture are used. Actual flow rates and TDS are not monitored.

Equipment Description

Open System Pumps (two per pole)	Gould 14JMC-2STG 364HP, 1,360 gpm
Cooling Towers (four per pole)	B.A.C. VTI-N220 53,100 cfm, 445 gpm max. ea.

(See enclosure details.)

2. EMISSION CHARACTERISTICS:

$PM_{10}/PM_{2.5}$	Previous	New
Particulate Matter 2.5um ($PM_{2.5}$): (Assumes all PM_{10} is $PM_{2.5}$)	0.030 lb/hr per pole	0.028 lb/hr per pole

[Calculation: Flow(gpm) X DF(%gal/gal flow) X TDS(ppm) * 8.34 lb/gal X 60 min/hr]

Drift, per pole	0.041 gal/min	0.036 gal/min
Max Exit Temperature	98 Degrees F	98 Degrees F
Min Exit Temperature	42 Degrees F	42 Degrees F

No other regulated pollutants or greenhouse gases are emitted.

3. **PCD DESCRIPTION:** Each cooling tower has dual layer drift eliminators reducing drift. A drift factor of 0.002% is used based on manufacturer data.

4. **EMISSION POINT:** Each cooling tower stack emission point is approximately 17 feet above ground level.

5. **OPERATING SCHEDULE:** Operation at ICS is 24 hours per day, seven days per week.

6. **ADDENDUMS:** Vendor details and a piping diagram are included to further clarify specific information related to this NOI.

7. **ADDITIONAL INFORMATION:** The IGS is operated under a Title V permit (#2700010003), and initially included the ICS cooling towers as a potential emission unit with the original Title V application in 1997. However, the ICS cooling towers are not included in that permit, being exempt as minor activity. The ICS, although co-located with the IGS, operates under alternate entities as described above.

Applicability Determinations

New Source Performance Standards. These non-combustion related cooling towers are not a source category under NSPS. Therefore, the cooling tower replacements do not trigger NSPS applicability.

Prevention of Significant Deterioration. The cooling tower replacements are not a major modification for PSD purposes, since there is no increase in emissions or potential to emit.

Further, although included with original PSD applications for the IPP as a whole, they have never been permitted by UDAQ as an emission unit under any AO. We believe that the ICS cooling towers may be considered as an area source, much as UDAQ must have done, and as such can qualify under R307-401-10(4) for source exemption from permitting. The ICS, although co-located with the IGS, operates under alternate entities as described above, and is controlled based not on IGS operation, but is dispatched based upon the entire power portfolio available from all sources connected to the ICS. Therefore, the ICS is not under the same control as IGS.

National Emission Standards for Hazardous Air Pollutants (NESHAPS). Since these towers are not associated with chemical manufacturing, they do not fall under any source category for NESHAPS.

Best Available Control Technology (BACT). Since the change described in this NOI is not a major modification for PSD purposes (no emissions increase), the dual layer drift eliminator design meets the required level of pollution control.

Potential-to-Emit. Since the capacity of the ICS already exceeds the maximum output capability of the IGS, the change has no impact on the capacity or emissions of the IGS. The PTE for IGS Units 1 & 2 would not change due to this additional unit. The ICS cooling towers will have a PTE (at 8760 hours of use) of:

$PM_{10}/PM_{2.5}$	Previous	New
Particulate Matter 2.5um ($PM_{2.5}$): (May assume all PM_{10} is $PM_{2.5}$)	0.27 tons/yr	0.23 tons/yr

TITLE V Permitting. Under R407-415-5e(1)(a), the cooling towers would be considered insignificant, and therefore not require an operating permit under Title V.

Should you require further information to expedite the approval of this request, please contact Mr. Jon P. Christensen, Superintendent of Technical Services, at (435) 864-4414, or by e-mail to jon-c@ipsc.com.

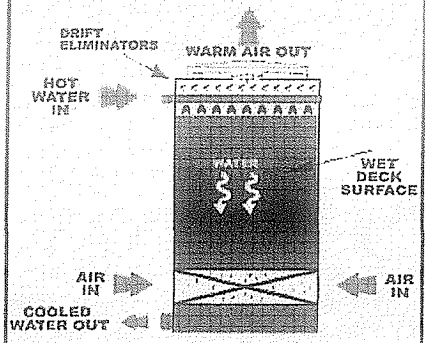
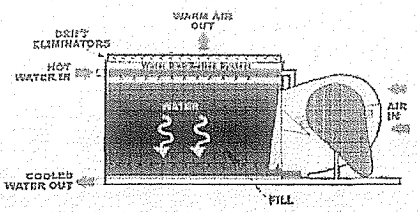
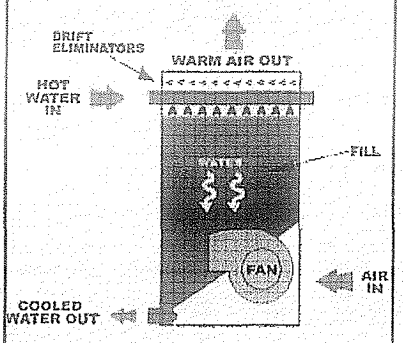
Cordially,

Jon A. Finlinson
President and Chief Operations Officer

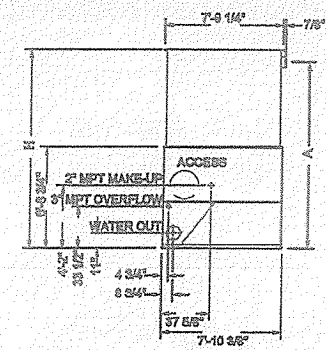
AQC
BP/RJC:jmj

Enclosures: Line Diagram and Manufacturer's Information

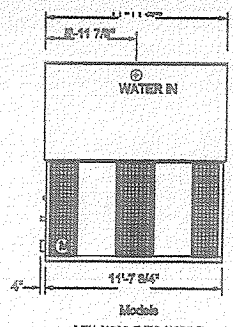
cc: Blaine Ipson, IPSC
Dipak Patel, LADWP CES
Nick C. Kezman, LADWP

PT2	Series V	
	VTL	VT0/VT1
		
Counterflow	Counterflow	Counterflow
Pressurized	Pressurized	Pressurized
Axial fan, induced draft	Centrifugal fan, forced draft	Centrifugal fan, forced draft
99 - 502 Nominal Tons 297 - 1506 GPM at 95°F/85°F/78°F	16 - 272 Nominal Tons 48 - 816 GPM at 95°F/85°F/78°F	12 - 1,335 Nominal Tons 36 - 4,005 GPM at 95°F/85°F/75°F
140°F (60°C) Standard Fill; 150°F (65.6°C) with alternative fill material	130°F (54.4°C) Standard Fill; 170°F (76.7°C) with alternative fill material	130° F (54.4°C) Standard Fill 170°F (76.7°C) with alternative fill material
Small to medium HVAC and industrial applications Ideal for Installations with limited footprint Counterflow unit Replacements	Small HVAC & industrial applications Installations with extremely low height requirements Indoor installations High temperature industrial applications Tight enclosures & installations requiring a single air inlet	Small to medium HVAC & industrial applications Indoor applications High temperature industrial applications Tight enclosures & installations requiring a single air inlet

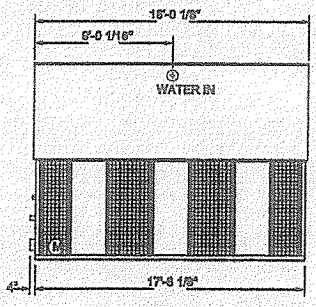
VT1 Engineering Data



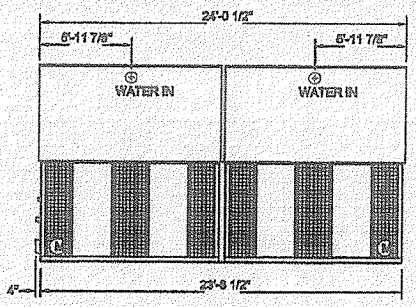
Models
VT1-N209-P TO N255-P



Models
VT1-N209-P TO N255-P



Models
VT1-N301-Q TO N395-R



Models
VT1-N418-P TO N510-P

Model Number	Nominal Tonnage[4]	Motor HP[3]	Airflow (CFM)	Weights (lbs)			Dimensions			Connections[2]	
				Operating[1]	Shipping	Heaviest Section[5]	A	H	B	Inlet	Outlet
VT1-N209-P	209	40	66,300	9,180	5,350	3,300	10' 7-5/8"	11' 5-1/8"	12"	8"	8"
VT1-N220-O	220	30	53,100	9,490	5,660	3,110	12' 4-5/8"	13' 2-1/8"	12"	8"	8"
VT1-N240-P	240	40	57,950	9,680	5,850	3,300	12' 4-5/8"	13' 2-1/8"	12"	8"	8"
VT1-N255-P	255	40	55,900	10,380	6,550	3,300	13' 9-3/8"	14' 6-7/8"	12"	8"	8"
VT1-N301-Q	301	50	86,150	13,380	7,530	4,590	10' 7-5/8"	11' 3-3/8"	12"	8"	8"
VT1-N326-P	326	40	77,450	14,110	8,260	4,550	12' 4-5/8"	13' 2-1/8"	12"	8"	8"
VT1-N346-Q	346	50	83,050	14,150	8,300	4,590	12' 4-5/8"	13' 2-1/8"	12"	8"	8"
VT1-N370-Q	370	50	80,150	15,130	9,280	4,690	13' 9-3/8"	14' 6-7/8"	12"	8"	8"
VT1-N395-R	395	60	84,750	15,250	9,400	4,710	13' 9-3/8"	14' 6-7/8"	12"	8"	8"
VT1-N418-P	418	(2) 40	120,600	18,490	10,680	6,580	10' 7-5/8"	11' 3-3/8"	11"	(2) 8"	10"
VT1-N440-O	440	(2) 30	106,200	19,110	11,300	6,200	12' 4-5/8"	13' 2-1/8"	11"	(2) 8"	10"
VT1-N480-P	480	(2) 40	115,900	19,490	11,680	6,580	12' 4-5/8"	13' 2-1/8"	11"	(2) 8"	10"
VT1-N510-P	510	(2) 40	111,800	20,890	13,080	6,580	13' 9-3/8"	14' 6-7/8"	11"	(2) 8"	10"

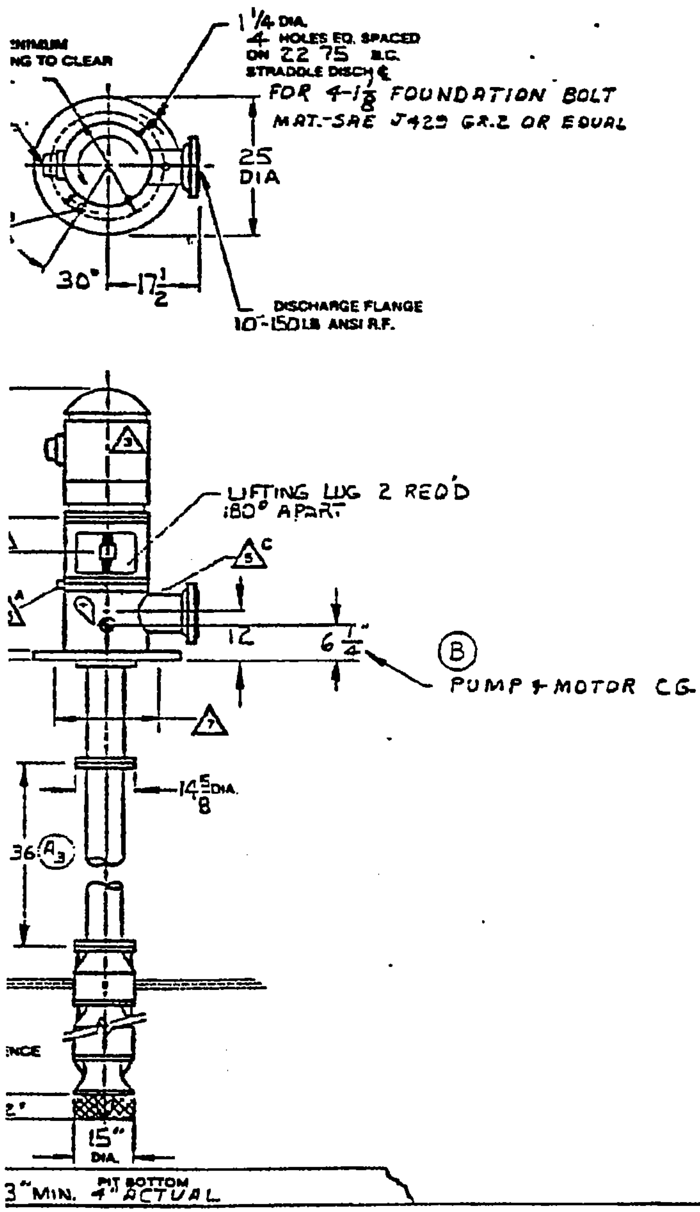
Do not use for construction. Refer to factory certified dimensions.

Notes:

1. Operating weight is for the tower with the water level in the cold water basin at overflow.
2. Unless otherwise indicated, all connections 6" and smaller are MPT. Connections 8" and larger are beveled for welding.
3. Fan horsepower is at 0" external static pressure.
4. Nominal tons of cooling represents 3 GPM of water cooled from 95°F to 85°F at a 78°F entering wet-bulb temperature.
5. Unit's casing section is the heaviest section.

Type of document	Document No	Rev.
1. GENERAL DOCUMENTS Manufacturer Designation: Pump: VIT-10x14 JMC-2STG Motor: RGZV-364HP Special Features: Bronze fitted, no impeller wear rings, impeller material 316 SS, bowl wear ring material cast iron class 30.		
6.11 Outline Drawing - Pump	308473	B
6.12 Outline Drawing - Motor	M3623 Page 22	2-84
6.13 Layout Drawing	11941 F	A3
- Part List - Pump	See document 6.31, Subtab 3	
- Part List - Motor	See document 4.32, Tab 4, Subtab 3	
6.14 Bill of Material New Type of Seal	No. 10GB-103B	
6.15 Typical Sectional Stuffing Box	SX-1023-00	

F 6.11



CUSTOMER ASEA INC.

(A3) INTERMOUNTAIN POWER PROJECT

P.O 7103/2614 NO. OF UNITS 5

ITEM —

PUMP SIZE 14JMC NO OF STAGES 2

GPM 1360 T.D.H. 115 FT.

LIQUID WATER

SP. GR. 1.0 TEMP. 95°F VISC. —

COLUMN 10 TUBE —

SHAFT 1.0 DIA. MAX. BRG. CENTERS 60

SEAL J CRANE, 8B2 CODE XF171

COUPLING. MFG. GOULDS SPACER LTH. 6 1/2

TYPE ADJUSTABLE SPACER

DRIVER MFG. SIEMENS-ALLIS

HP. 60 RPM 1760 F/L VSS ☒ VHS ☐

PH. 3 CYCLES 60 VOLTS 460

THRUST —

ENCLOSURE TEFC FRAME 364 HP (A2)

WEIGHT: PUMP 1630 LBS.

(A2) DRIVER 830 LBS.

(A2) TOTAL 2460 LBS.

IMPELLER DIA. 8.69 D, 0.13 x 2.0 U.F.

(B)

RESONANCE #1 681 CPM
#2 685 CPM
#3 863 CPM
#4 1094 CPM
#5 5227 CPM

DAMPING FACTOR 2%
MAXIMUM HORIZONTAL ACCELERATION IS 1.3%
MAXIMUM VERTICAL ACCELERATION IS 0.56%

NO.	
1	T.P.L. (TOTAL PUMP LENGTH) IS THE DISTANCE TO LOWEST PROJECTION ON PUMP AND INCLUDES OPTIONAL STRAINER AND/OR FLUSHLINE WHEN SPECIFIED.
2	TOLERANCE ON ALL DIMENSIONS IS ± 1/8" OR ± 1/8" PER 5 FEET, WHICHEVER IS GREATER.
3	DRIVER MAY BE ROTATED AT 90° INTERVALS ABOUT VERTICAL CENTERLINE FOR DETAILS REFER TO DRIVER DIMENSION DRAWINGS
4	HT - DISTANCE DRIVER FACE TO TOP OF HEADSHAFT.
5	A 3/4 NPT - MOTOR BASE DRAIN. (PLUGGED) B - 1/2 NPSF - SEALING ELEMENT DRAIN (PLUGGED) C - 1/2 NPT - GAGE TAP. (PLUGGED)
6	ALL DIMENSIONS SHOWN ARE IN INCHES UNLESS OTHERWISE STATED - DWG IS NOT SCALE
7	MINIMUM DIAMETER RECOMMENDED TO CLEAR PUMP AND COLUMN ASS'Y. IS 17
8	BOWL & COL. ASSY EXTERIOR TO BE COATED WITH ENGARD NO 450 TO 12 MILS DRY FILM THICKNESS. HEAD EXTERIOR TO BE ALKYD ENAMEL (GLIDDEN BLUE NO 77-50.
9	
10 (A4)	DESIGN PRESS 85 PSIG DESIGN TEMP. 95° F

LTR.	REVISION	BY	DATE
B	ADDED DATA	RJC	11-29-84
A6	DELETED NOTE 9		
A5	CERTIFIED OUTLINE		
A4	REVISED NOTE 10		
A3	ADDED		
A2	ADD MOTOR DATA	RJC	7-11-84
A1	TPL WAS 9'-6 3/4"		

DO NOT USE FOR CONSTRUCTION
UNLESS CERTIFIED

(A5) CERTIFIED BY [illegible] DATE 7-25-84

TITLE OUTLINE MODEL VIT-FF
10 x 14JMC - 2 STG

DRAWN BY Timothy M Dack DATE 5-22-84 CHECKED BY [illegible] DATE 5-30-84

GOULDS PUMPS
VERTICAL PUMP DIVISION
INDUSTRY CALIFORNIA

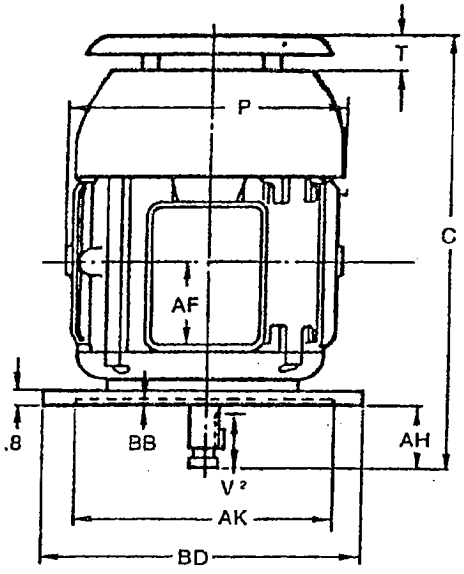
E.O NUMBER 308471

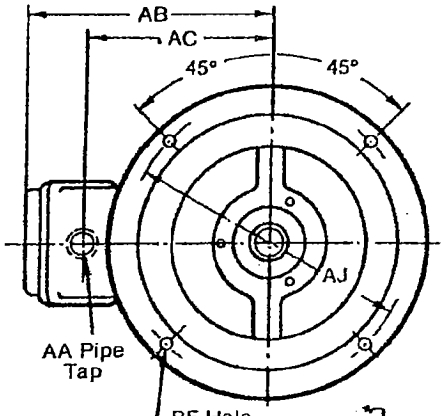
6.11

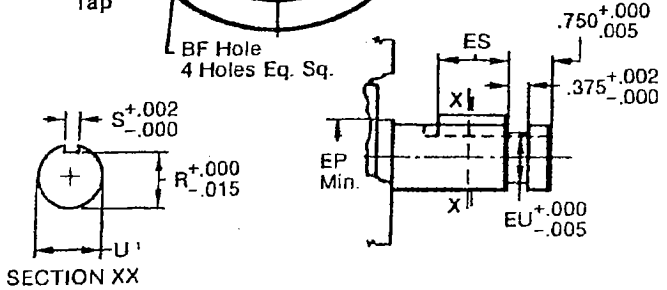
Dimensions

NEMA Type P Base — Antifriction Bearing
FRAMES 284 VP-HP — 365 VP-HP

REED FREQ = 50 Hz
CENTER OF GRAVITY = 11.48"







STANDARD DIMENSIONS — IN INCHES

FRAME	284 VP-HP	284 HPH	286 VP-HP	286 HPH	324 VP-HP	326 VP-HP	364 VP-HP	365 VP-HP
C	27.2	29.0	28.8	30.5	31.9	33.4	33.1	34.1
P	14.8	14.8	14.8	14.8	16.6	16.6	18.2	18.2
T	4.5	4.5	4.5	4.5	4.9	4.9	3.6	3.6
U¹	1.125	1.625	1.125	1.625	1.625	1.625	1.625	1.625
V²	2.50	4.25	2.50	4.25	4.25	4.25	4.25	4.25
EU	.875	1.250	.875	1.250	1.250	1.250	1.250	1.250
AH	2.75	4.50	2.75	4.50	4.50	4.50	4.50	4.50
AJ	9.125	14.750	9.125	14.750	14.750	14.750	14.750	14.750
AK	8.250	13.500	8.250	13.500	13.500	13.500	13.500	13.500
BB	.19	.25	.19	.25	.25	.25	.25	.25
BD	10.0	16.5	10.0	16.5	16.5	16.5	16.5	16.5
BF	.44	.69	.44	.69	.69	.69	.69	.69
EP	1.750	1.750	1.750	1.750	2.125	2.125	2.250	2.250
AA	1.50	1.50	1.50	1.50	2.00	2.00	3.00	3.00
AB	11.1	11.1	11.1	11.1	13.8	13.8	17.0	17.0
AC	9.1	9.1	9.1	9.1	10.7	10.7	13.2	13.2
AF	3.5	3.5	3.5	3.5	5.0	5.0	6.2	6.2
R	.986	1.416	.986	1.416	1.416	1.416	1.416	1.416
S	.250	.375	.250	.375	.375	.375	.375	.375
ES	1.25	3.00	1.25	3.00	3.00	3.00	3.00	3.00
Approx. Ship. Wt. Lbs.	370	370	420	420	565	600	830	885

¹ Shaft limits for dimension U are +.000 −.001".
² Shaft length available for coupling.

TOLERANCES

AK Dim. $8.250^{+.003}_{-.000}$ / $13.500^{+.005}_{-.000}$	U Dim. $1.125^{+.0000}_{-.0005}$ / $1.625^{+.0000}_{-.0010}$
AH Dim. ±.030 — 280 - 360 FR.	with motor in vertical position, shaft down

INDICATOR READING

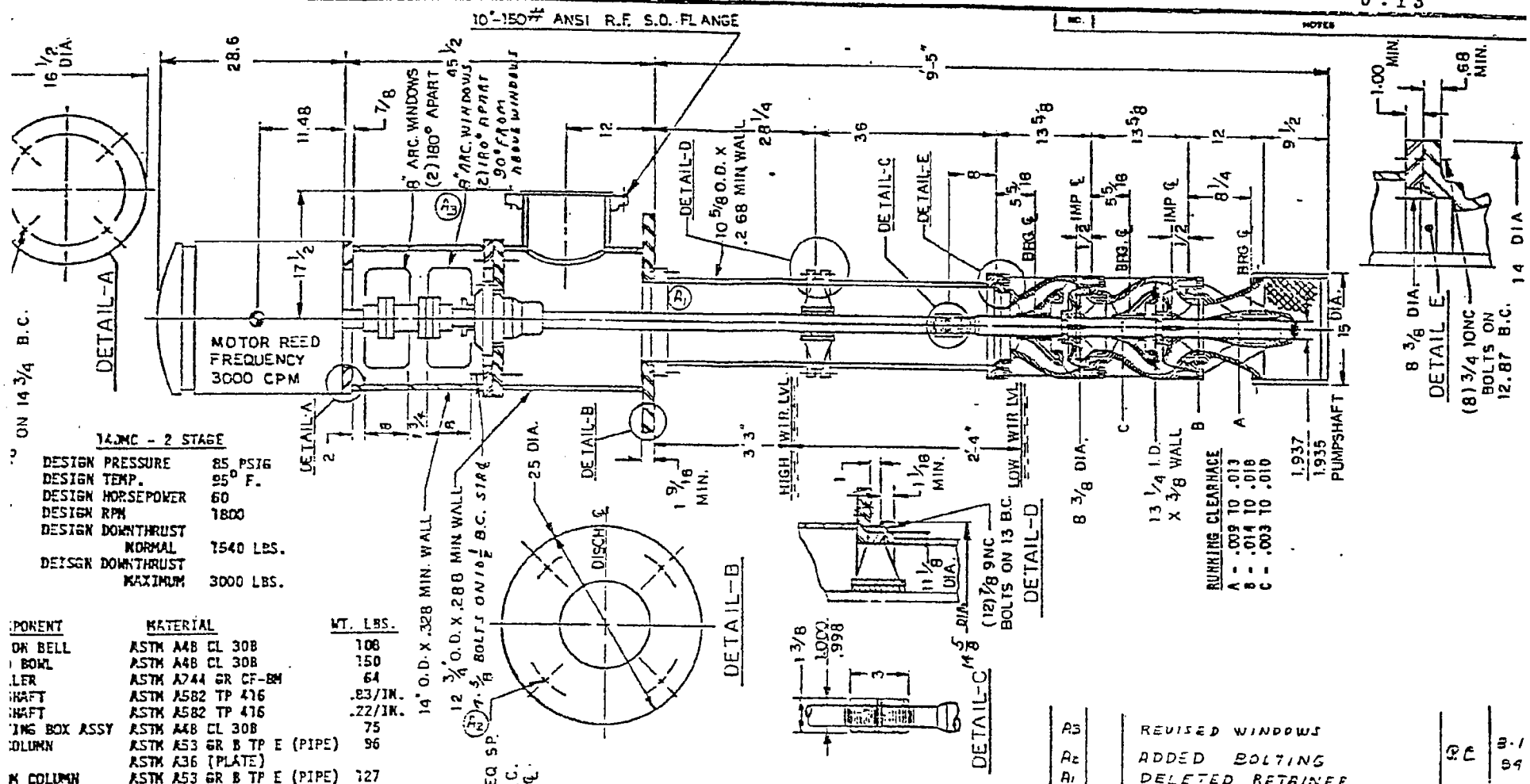
Frame	Max. Face Runout	Permissible Eccentricity of Mfg. Rabbet	Permissible Shaft Runout
284-286 VP-HP	.004	.004	.002
284-286 HPH	.006	.006	.002
324-365 VP-HP	.006	.006	.002

GOULDS S.O 308471 + 308473

CERTIFICATION

CUSTOMER Goulds Pumps
P.O. 70934 + 70935 ITEM 1
S.O. LATER ITEM
H.P. 60 RPM 1800 FR. 364 HP
PH/HZ/VOLTS 3-60-460
BY G. Kagero DATE 5/22/84

NOT FOR CONSTRUCTION, INSTALLATION OR APPLICATION PURPOSES UNLESS CERTIFIED



14JMC - 2 STAGE

DESIGN PRESSURE	85 PSIG
DESIGN TEMP.	85° F.
DESIGN HORSEPOWER	60
DESIGN RPM	1800
DESIGN DOWNTHRUST NORMAL	1540 LBS.
DEISGN DOWNTHRUST MAXIMUM	3000 LBS.

PONENT	MATERIAL	WT. LBS.
ON BELL	ASTM A48 CL 30B	108
BOWL	ASTM A48 CL 30B	150
LER	ASTM A744 GR CF-8M	64
HAFT	ASTM A582 TP 416	.83/IN.
HAFT	ASTM A582 TP 416	.22/IN.
ING BOX ASSY	ASTM A48 CL 30B	75
OLUMN	ASTM A53 GR B TP E (PIPE)	96
	ASTM A36 (PLATE)	
N COLUMN	ASTM A53 GR B TP E (PIPE)	127
	ASTM A36 (PLATE)	
NS		4
HAFT CPLG	ASTM A582 TP 416	10
CPLG ASSY	ASTM A108 GR 1215	30
ARGE HEAD	ASTM A53 GR B TP E (PIPE)	384
	ASTM A36 (PLATE)	
NER	ASTM A395 GR 60-40-18	30
	— —	830
SUPPORT	ASTM A53 GR B TP E (PIPE)	531
	ASTM A36 (PLATE)	
TING	SAE 1429 GR.2	

LTR	ZONE	REVISION	BY	DATE
A3		REVISED WINDOWS	RE	8-1
A2		ADDED BOLTING		84
A1		DELETED RETAINER		

TOLERANCES EXCEPT AS NOTED.
DECIMALS .XXX = ± .010
.XX = ± .032
.X = ± .062
ANGLES ± ½ DEGREE
CONCENTRICITY. MAX T.I.R. BETWEEN ANY TWO CONCENTRIC DIAMETERS IS ¼ THEIR MAX TOLERANCE
SQUARENESS.
MACHINED FACES MUST BE PARALLEL WITH EACH OTHER AND PERPENDICULAR TO MACHINED DIAMETERS WITHIN .002 T.I.R.
BREAK ALL SHARP EDGES .005 — .015

TITLE: MODEL, VIT 10 X 14 JMC-2 STAGE LAYOUT

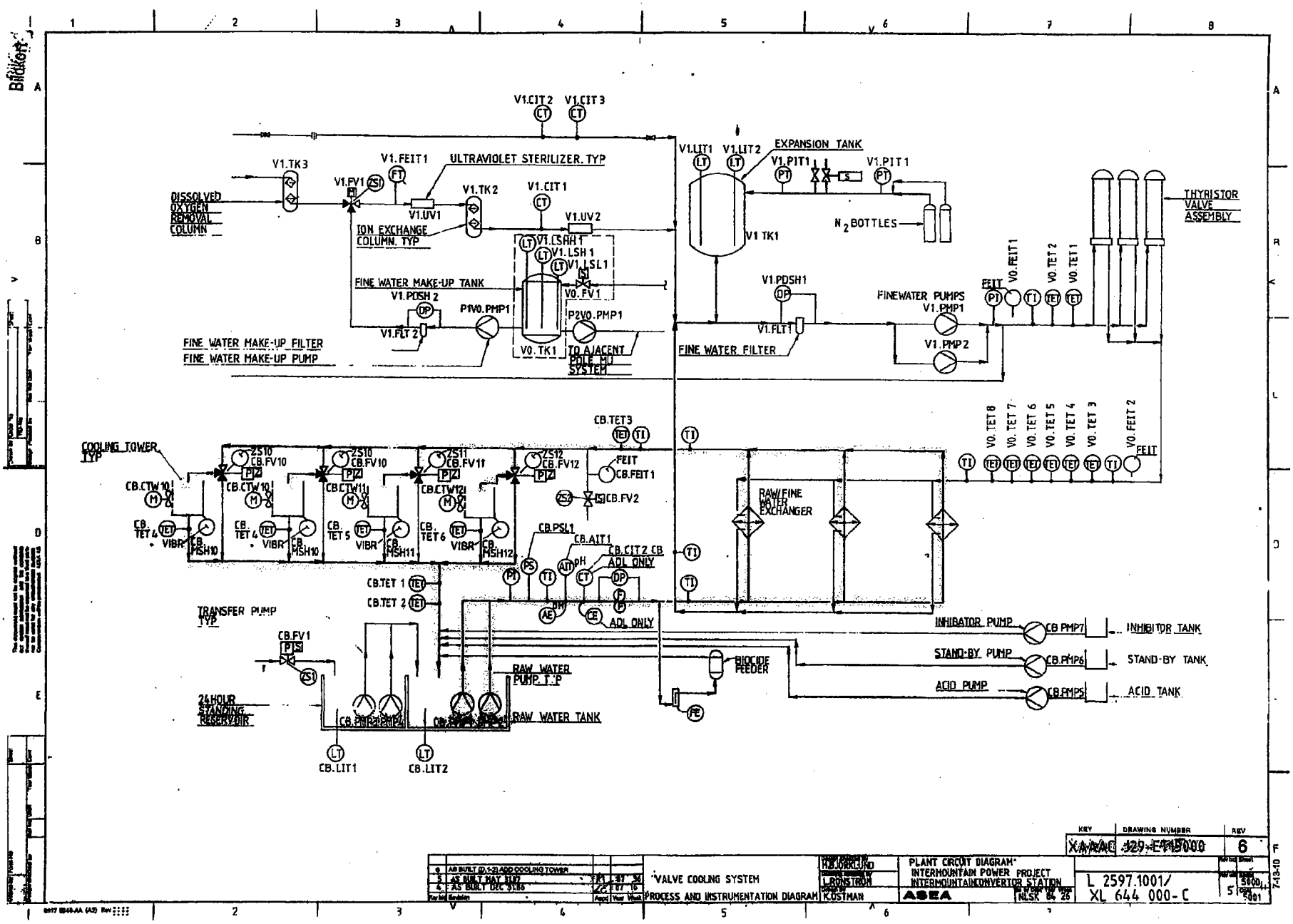
DRAWN BY	DATE	CHECKED BY	DATE	SCALE	ORDER NUMBER
V. ANCIRA	7-2-84	R. Castillo	7-10-84	NONE	308471/73

PATTERN INDEX | MACHINE INDEX | PATTERN NUMBER

GOULDS PUMPS
VERTICAL PUMP DIVISION
INDUSTRY, CALIFORNIA

DRAWING NUMBER: 11941F

DIST.


V1.CIT2
V1.CIT3
V1.TK3
V1.FEIT1
ULTRAVIOLET STERILIZER. TYP
V1.FV1
V1.TK2
V1.CIT1
DISSOLVED OXYGEN REMOVAL COLUMN
V1.UV1
V1.UV2
ION EXCHANGE COLUMN. TYP
V1.LSHH1
V1.LSH1
V1.LSL1
FINE WATER MAKE-UP TANK
V1.PDSH2
V0.FV1
P1V0.PMP1
P2V0.PMP1
V1.FLT2
V0.TK1
TO AJACENT POLE MU SYSTEM
FINE WATER MAKE-UP FILTER
FINE WATER MAKE-UP PUMP
V1.LIT1
V1.LIT2
EXPANSION TANK
V1.PIT1
V1.PIT1
N2 BOTTLES
V1 TK1
V1.PDSH1
V1.FLT1
FINE WATER FILTER
FINEWATER PUMPS
V1.PMP1
V1.PMP2
FEIT
V0.FEIT1
V0.TET2
V0.TET1
THYRISTOR VALVE ASSEMBLY
V0.TET8
V0.TET7
V0.TET6
V0.TET5
V0.TET4
V0.TET3
V0.FEIT2
FEIT
CB.TET3
COOLING TOWER TYP
ZS10 CB.FV10
ZS10 CB.FV10
ZS11 CB.FV11
ZS12 CB.FV12
FEIT CB.FEIT1
ZS2 CB.FV2
CB.CTW10
CB.CTW10
CB.CTW11
CB.CTW12
CB TET4 VIBR
CB TET4 VIBR
CB TET5 VIBR
CB TET6 VIBR
CB MSH10
CB MSH10
CB MSH11
CB MSH12
RAW/FINE WATER EXCHANGER
CB.PSL1
CB.AIT1
CB.CIT2 CB ADL ONLY
CB.TET1
CB.TET2
TRANSFER PUMP TYP
CB.FV1
ADL ONLY
INHIBITOR PUMP
CB PMP7
INHIBITOR TANK
STAND-BY PUMP
CB PMP6
STAND-BY TANK
ACID PUMP
CB PMP5
ACID TANK
BIOCIDE FEEDER
RAW WATER PUMP T.P
24HOUR STANDING RESERVOIR
RAW WATER TANK
CB.LIT1
CB.LIT2
VALVE COOLING SYSTEM
PROCESS AND INSTRUMENTATION DIAGRAM
H.BJORKLUND
L.RONSTRÖM
K.OSTMAN
PLANT CIRCUIT DIAGRAM
INTERMOUNTAIN POWER PROJECT
INTERMOUNTAINKONVERTOR STATION
ASEA
L 2597.1001/
XL 644 000-C
DRAWING NUMBER
329-E415000
REV
6

IPP STS Upgrade Project		Document Number 1JNL100133-874 Rev. 01	No of Pages 15
			No of Attached Pages
Prepared Malin Svensson, 2010-01-19		Title Work Description	Reg./Class no. IPP-1--30
Approved Hans-Ola Bjarme, 2009-04-21	Resp Dept TVP		

This document is issued by means of a computerized system. The digitally stored original is electronically approved.
The approved document has a name and date entered in the approved-field. A manual signature is not required.

Summary

This document describes the main valve cooling system installation work of new components and piping modifications for the IPP STS Upgrade Project. The aim with the document is to give the project and the intended contractor a fair idea of what work is needed, how to plan the job and propose modifications. Based on this document a preliminary time schedule has been made.

Rev ind	Revision text	Prepared	Approved
1		Malin Svensson 2010-01-19	Not Issued!

1 GENERAL INFORMATION

This document describes the work to be performed on two AC/DC Converter Stations for upgrade of the Thyristor Valve Cooling Systems. The project is part of the larger IPP STS Upgrade Project which involves additions and upgrade work in the AC and DC Substation Yards.

Two main areas or buildings will be involved in the Valve Cooling Upgrade:

1.1 The Auxiliary Building - Valve Cooling Heat Exchanger Replacement

- Heat exchanger replacement
- Piping and support modifications to fit new heat exchangers
- External pipe flow meter additions

See drawings: J29-MA14, J29-MA16, J29-MR823,J30-MA25, J30-MA27, J30-MA28, J30-MR823

1.2 The Cooling Towers and Raw Water Pump Station:

- Cooling tower replacement and associated piping
- Cooling tower upgrades to electronic damper operation
- Additional cooling towers
- Pneumatic valve upgrades to electronic operation

See drawings: J29-MA12, J29-MA13, J29-MA15, J29-MA17, J30-MA23, J30-MA24, J30-MA26

There are a fair amount of pipe dimensions provided in this document. These dimensions shall be regarded as preliminary until the "For Construction" drawings are available.

2 DRAWING LIST

2.1 IPP STS Upgrade Cooling Water System - Intermountain Converter Station

2.1.1 Existing Drawings Revised:

J29-MR900 R3A: Piping Plan Cooling Tower

J29-SR302 R3A: Ground Level (Foundation) Plan Cooling Tower Facility

J29-ER315 R4A: Grounding Plan First Floor – Cooling Tower Facility

J29-MR823 R3A: Piping Sections (New Flow Meters) Auxiliary Building

2.1.2 New Drawings Generated:

J29-MA12 R0B: Piping Plan – IPP STS Upgrade Cooling Tower and RAW Water Piping

J29-MA13 R0B: Piping Sections – IPP STS Upgrade Cooling Towers and RAW Water Piping

J29-MA14 R0A: Piping Plan & Sections – IPP STS Upgrade Auxiliary Building – First Floor Valve Cooling

J29-MA15 R0A: Piping Removal/Demo – Cooling Towers and RAW Water Cooling Tower Facility First Floor

J29-MA16 R0A: Removal/Demo – Heat Exchanger Area Auxiliary Building – First Floor Valve Cooling

J29-MA17 R0: SS Pipe Fabrication – IPP STS Upgrade Auxiliary Building – Valve Cooling

J29-SA143 R0C: Foundation Details Cooling Tower and RAW Water Piping

2.2 IPP STS Upgrade Cooling Water System – Adelanto Converter Station

2.2.1 Existing Drawings Revised:

J30-MR900 R4A: Piping Plan Cooling Tower

J30-SR302 R3: Ground Level (Foundation) Plan Cooling Tower Facility

J30-ER315 R2: Grounding Plan First Floor – Cooling Tower Facility

J30-MR823 R3: Piping Sections (New Flow Meters) Auxiliary Building

2.2.2 New Drawings Generated:

J30-MA23 R0: Piping Plan – IPP STS Upgrade Cooling Tower and RAW Water Piping

J30-MA24 R0: Piping Sections – IPP STS Upgrade Cooling Towers and RAW Water Piping

J30-MA25 R0: Piping Plan & Sections – IPP STS Upgrade Auxiliary Building – First Floor Valve Cooling

J30-MA26 R0: Removal/Demo – Cooling Towers and RAW Water Piping Cooling Tower Facility First Floor

J30-MA27 R0: Removal/Demo – Heat Exchanger Area Auxiliary Building – First Floor Valve Cooling

J30-MA28 R0: SS Pipe Fabrication – IPP STS Upgrade Auxiliary Building – Valve Cooling

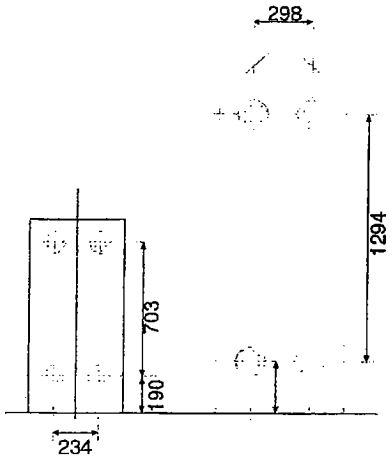
J30-SA237 R0: Foundation Details Cooling Tower and RAW Water Piping

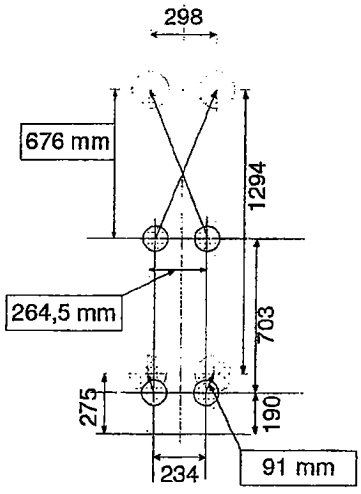
3 HEAT EXCHANGERS

3.1 General

There are two closed loops in the Cooling Water System. The Fine Water loop (stainless steel) circulates between the Thyristor valves and the Heat Exchangers. The Raw Water loop (carbon steel) circulates between the Heat Exchangers and the Cooling Towers.

The old heat exchangers will be exchanged to new significantly larger units with higher cooling capacity and extended thermal length. The new unit inlets and outlets will be larger (4" to 6") and, in addition will have parallel flow (same side in and out). This will require modification of each of the connecting headers in height and position for the top two connections (see below).





Dimension differences between the old and new heat exchangers. Pipe connections: Old heat exchanger: ASME 4" (DN100) New heat exchanger: ASME 6" (DN150)	Inlet-outlet: Old heat exchanger: Cross flow New heat exchanger: Parallel flow FW: In left low - out left high RW: In right high – out right low

3.2 Work to be performed while the existing system remains in operation

3.2.1 Modify Heat Exchanger foundations

Three (3) concrete foundations for the heat exchangers for each pole at each converter station shall be extended in accordance with drawings to be provided. This work shall be done before the pole outage so not to interfere with the cooling system function. One heat exchanger is always isolated (stand by) and can be removed if necessary while working on the concrete foundation. The stand-by heat exchanger can be removed from service as long as the other two (2) heat exchangers on the pole remain in operation.

3.2.2 Fabricate Heat Exchanger Rear Support Steel foundations

The installation of the new Heat Exchanger Rear Supports will be required for installation and setting of the new heat exchangers.

See "Elevation "X" Detail Heat Exch Rear Support at Floor" on drawing J29-MA14 and J30-MA25

Six (6(3) steel supports, one for each exchangers, twelve (12 total for both sites) shall be pre-fabricated extended in accordance with drawings provided. The steel work shall be done before the pole outage so not to interfere with the cooling system function.

3.2.3 Prefabrication of pipes

Each of the inlet and outlet headers will require modifications at the connection points to the new heat exchangers. This will be accomplished by prefabricating new pipe spools for each connection point.

The new stainless steel spools for the Fine Water Supply and Return headers shall be prefabricated and supplied by ABB, Inc. as shown on drawings J29-MA17 and J30-MA28 (BOM Items 1115, 1116 and 1117).

The carbon steel spools for the Raw Water Supply and Return headers shall be prefabricated by the installing contractor as shown on the drawings J29-MA14 and J30-MA25. See "Plan View - New Heat Exchangers" and Elevations "C" and "E", and "Elevation "E" Detail Vertical Offsets" (BOM Item 1120 inclusive for all carbon steel pipe).

The following pipes shall be prefabricated in accordance with detailed drawings

3.2.4 Prefabrication of pipe support

The top headers will be mounted at higher level to match the new heat exchanger connections compared with the present level. The existing pipe support PS-3 will require modification to match the raised header connections. The new support PS-1 and modification to PS-3 shall be prefabricated to avoid delay during the outage when all pipe modifications will be done at site. The existing PS-1 is to be removed completely including the offset steel legs, plates and bolts. It is to be replaced with three new single column supports PS-1New, PS-1A, and PS-1B. See "Plan View – New Heat Exchangers", Elevations "C" and "E" and "Pipe Supports" on drawing J29-MA14, and J30-MA25.

The "PS-1 New" will be mounted on the existing pad. The new PS-1A will be also use the existing pad. The new PS-1B will be relocated as shown on the "Plan View – New Heat Exchangers". The existing pad(s) for this support position will be abandoned.

3.3 Possible work during a short outage in May 2010

All the work on the heat exchangers or the associated piping for the heat exchangers will significantly impact cooling system function except the work on the extension of the concrete foundations. A 2-3 day outage does not provide sufficient time to complete this work.

3.4 Work during main pole outage

3.4.1 Drain valve cooling system

Refer to drawings J29-MA16 and J30-MA27 and the "Existing Heat Exchanger Removal Sequence".

The Raw Water system and Fine Water systems will need to be drained before start of the work.

Check for readiness of cooling water system from the site operations personnel prior to proceeding. If the system can be partly isolated by suitably located valves, then only the pipes in the working area around the heat exchangers need to be drained.

3.4.2 Remove the three (3) old heat exchangers on the chosen pole

Disconnect the three (3) heat exchangers from the piping system and remove them from their respective foundations.

Disconnect and remove the reducer cone flange, assemblies used to adjust the existing heat exchanger 4" flange connections to the 6" header piping. These will be replaced with the new prefabricated 6" flanged spools (BOM Items 1115, 1117, 1120).

Remove the three (3) heat exchangers from their respective foundations.

Disconnect the reducer cones, used to adjust the existing heat exchanger flanges dimension to the piping dimension.

Modify the foundation for the new heat exchangers in accordance with drawing details.

3.4.3 Install lower new connection pipes

See drawings: J29-MA14, J30-MA25.

Install smaller new prefabricated adjustment pipes on the pipe ends towards lower heat exchanger connection. Leave the flange connections loose (BOM Items 1115, 1120).

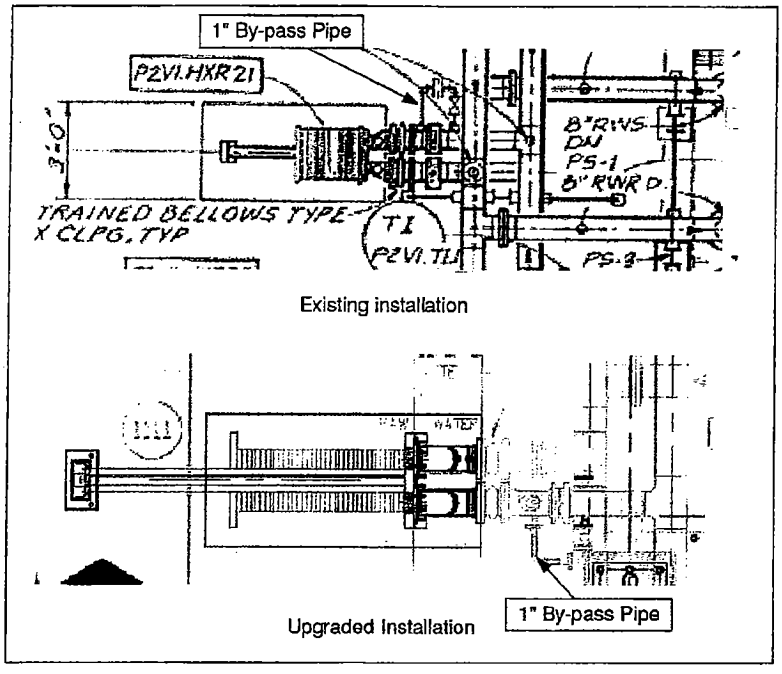
3.4.4 Install new heat exchangers.

Set the new heat exchangers on the existing foundations using the new prefabricated rear support as shown in Elevation "X" Detail Heat Exch Rear Support at Floor" on drawings J29-MA14 and J30-Ma25. Fit lower flange connection to the new prefabricated pipes. The pipes can rotate around the loose flanges to adjust the horizontal and vertical differences. Do not fix the heat exchangers to the basement. It may also be necessary to adjust the foundation support base plates for the pipe supports using double nuts

3.4.5 Connect branch piping to Heat Exchangers

The top connection on the new heat exchangers shall shift upward compared with the old heat exchangers. There will be a conflict with de small the stainless steel 1" by-pass to a 6" butterfly valve and the raw water piping. It has to be changed, see

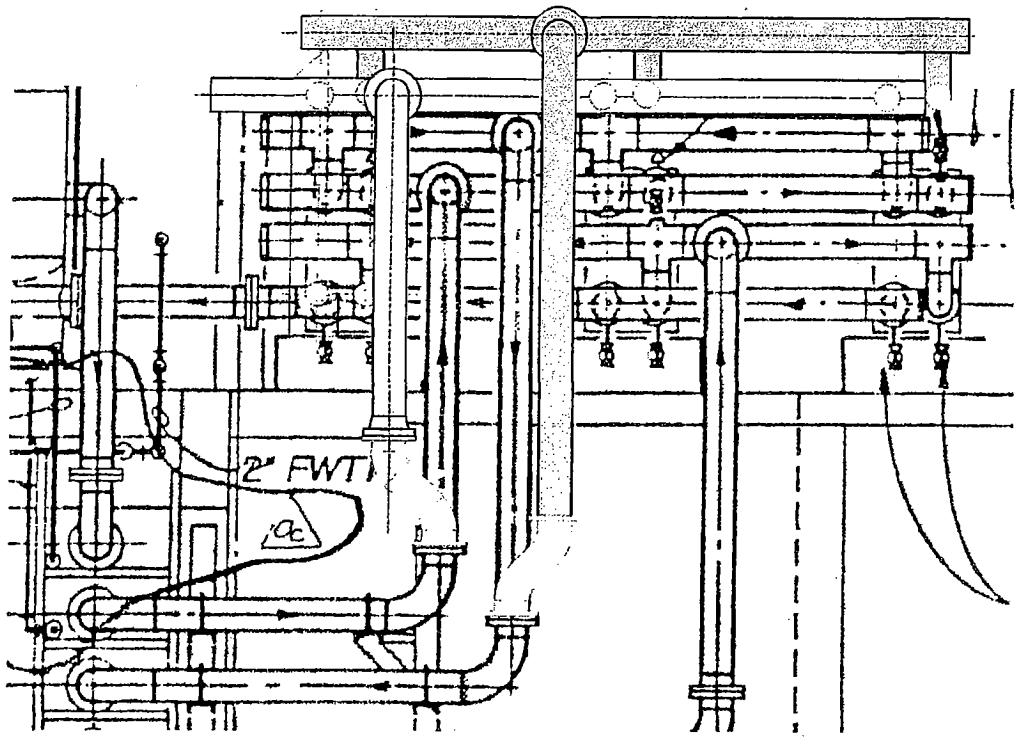
drawing and figure below. To lift the headers easier remove the branch pipes to each heat exchanger during the lift. Elevate the top headers.



3.4.6 Elevate the top headers

See "Plan View – New Heat Exchangers" with Elevations "C" and "E" on drawings J29-MA14 and J30-MA25

Disconnect the flanges on the vertical pipes to the two (2) top headers. Lift the headers so the two prefabricated pipes can be inserted (BOM Items 1116 and 1120). The FW headers shall be moved left and the raw water headers shall be moved right. Install prefabricated parts of pipe support to support the new elevation of the headers (BOM Items 1116 and 1120).



Detail: Installation of Pipes Elevating the Headers (BOM Item 1116 and 1120)

3.4.7 Connection of new heat exchangers to system

Install the branch piping to each heat exchanger with the modified FW bypass pipe (BOM Item 1119). Adjust the heat exchangers if necessary. The flexible joints shall be able to cover small misalignments. When all pipes are connected, fix each heat exchanger to its foundation in accordance with drawing details. Reconnect existing grounding to the new heat exchangers and pipe supports.

4 COOLERS AND 3-WAY VALVES

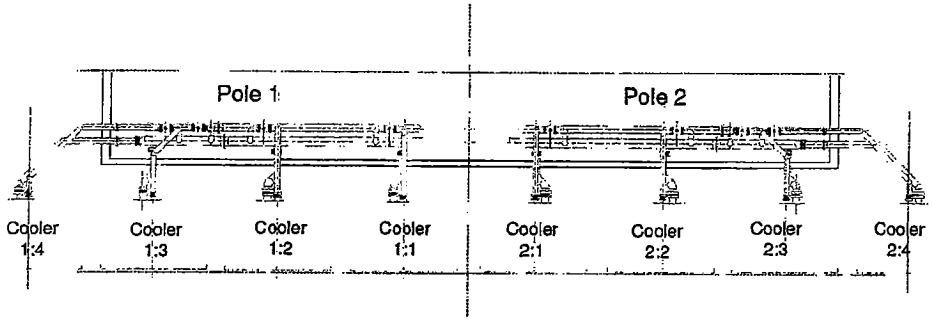
4.1 General

There is a separate building where the Raw Water System for both poles is installed, called the Raw Water Pump Station. The evaporating coolers are installed just outside the building.

See drawings: J29-MA12, J29-MA13, J29-MA15, J30-MA23, J30-MA24J30-MA26

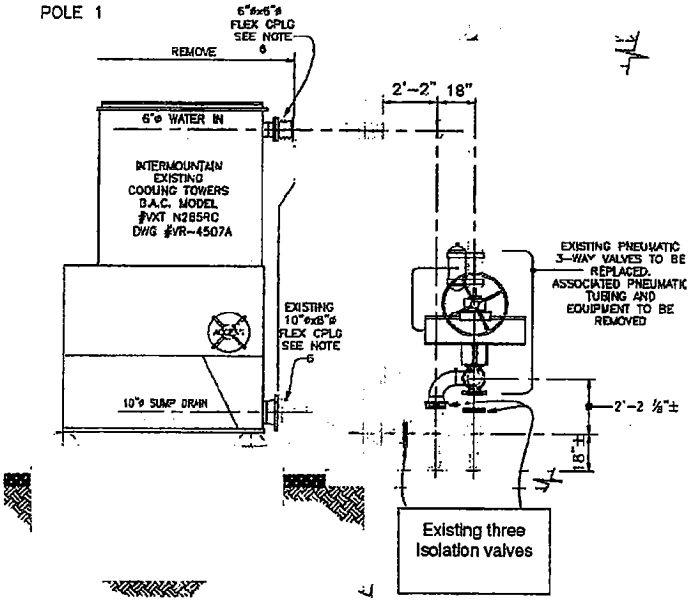
There will be one new cooler added to each cooler bank or pole. At Intermountain all of the existing old coolers shall be exchanged for new coolers. Today there are 3 coolers in each bank or pole, i.e. cooler 1, 2 and 3. The new coolers will be the forth cooler in each pole. See figure below

Note the pole designations shown below are for Intermountain. They are opposite or mirrored for Adelanto



4.2 Work during operation

The coolers can be isolated from the system by closing three (3) isolation valves.



Existing Cooler installation

Each pole has a redundant cooler. One cooler can therefore be exchanged while the system is in operation. Each new cooler in Intermountain has higher capacity compared with the existing units. There is no risk, from a capacity point of view, to exchange the existing coolers during operation with the new ones, as long as only one cooler at the time is exchanged with the remaining two (2) units in full operation. To give extra capacity security this exchange of coolers should not be performed during the hottest summer months.

One factor, which can complicate the exchange, is that the new coolers have electrically controlled fan dampers whereas the existing coolers have

pneumatically controlled dampers. It presently appears impossible to run both pneumatic control and electrical control in parallel. ABB is investigating this further. If parallel operation is not possible, then we have to operate the coolers with maximum opening of the dampers, i.e. without any control. This should not create any problem if the work is performed during the summer season.

The compressed air pressure vessel, for the pneumatic system of both poles, is installed in the corner of the building where the pipes to the new 4th cooler in pole 2 will enter the building. The complete pneumatic system shall be removed as part of the system upgrade, but this can not be done before all control functions have been changed from pneumatic to electric.

The new coolers at Intermountain will have the incoming pipe at a slightly higher elevation compare with the existing coolers. Also the new incoming (upper) connections will be 8" instead of the existing 6". To adjust for this a new 8"x6" eccentric flexible coupling will replace the existing 6"x6" flexible coupling. To adjust for this, the vertical pipe to cooler shall be cut and a pair of flanges on stub ends installed. This will also prepare for the later pipe adjustments to new 3-way valves, which can not be installed while the system remains in operation. The bypass pipe between the 3-way valve and the return water header is direct connected to the isolation butterfly valve. The valve is pressed between the bypass pipe flange and the header flange. The bypass pipe needs to be exchanged to fit the new 3-way valve.

4.2.1 New cooler foundations

The old foundations in Intermountain shall be used for the new coolers.

The existing foundations for the outer two coolers will need to be modified to extend the I-beam support rails and share the load of the new coolers to be added at each end. See drawings J29-SR302, and J29-SA143, J30-SR302, and J30-SA240 for details and dimensions.

Two new augered piers will be required for pipe supports for the piping extensions to the two new coolers. See drawings J29-SR302, and J29-SA143, J30-SR302, and J30-SA240 for details and dimensions.

New foundations shall be constructed for the new extra cooler in each pole both at Intermountain and Adelanto. The new cooler shall be installed just outside the left corner of the RW-building for Pole 1 and just outside the right corner of RW-building for pole 2. For pole 2 there will be a conflict with an existing access road, however the Customer has agreed to re-route this access road. For pole 1, there may be some conflicts with underground piping. Alternately the underground piping may be re-routed.

4.2.2 Exchanging coolers

All new coolers can be installed during operation. In intermountain the old coolers shall be exchanged to new ones. Only one cooler a time can be isolated and exchanged.

Verify all new coolers have been delivered without transport damage. 2.

Ask control room for permission to close Cooler 1

Isolate and disconnect existing Cooler 1

Disassemble and remove existing cooler 1

Install the new Cooler 1 according to installation instructions from Baltimore Air Coil (BAC). The same frame as used for the old cooler shall be used for the new cooler. 6.

The old rubber expansion joint for the water inlet to cooler shall be exchanged against a new eccentric joint.

Adjust and connect piping system to new Cooler in accordance with drawings.

Connect the Cooler to the system by opening the isolation valves.

Check function of the new Cooler.

If the new cooler checks out OK, then isolate next cooler and perform the same exchange sequence for coolers 2 and 3.

The new 4th cooler is the last one to be installed per pole on its new foundation. This cooler can not be connected to the system during operation. This work must wait until the pole outage.

It is possible there may be a brief 2-3 day outage in May 2010. If so, then some minor preparation work can be done, such as:

Exchange of make-up valve: This is a relatively minor job, consisting of exchanging the two pneumatically controlled shutoff valves with two new electrically controlled ball valves. The pneumatic control interface should be fairly simple, i.e. it should be possible to use it for the electrical control. If not, then the Customer may accept to operate the make-up valve manually for a limited time period.

Exchange of isolation valve: It may be possible to exchange the by-pass isolation valve to a "lugged valve", which can be fixed even if one flange is disconnected. This was not planned from the beginning. If this is done, then the 3-way valves and most of the modifications of the cooler piping can be performed while the system is operational. This has to be investigated further before any final decision.

4.3 Work during the outage

Refer to drawings J29.

During the main outage the pneumatic 3-way valves shall be exchanged with electrically controlled 3-way valves, the headers shall be modified to connect the new 4th cooler and the final pipe connection shall be done.

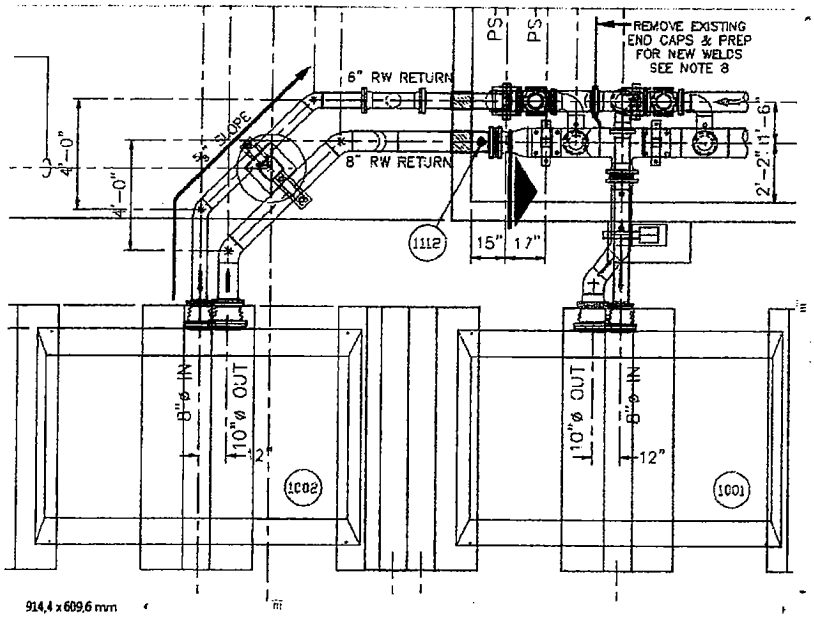
4.3.1 Removing pneumatic control

All existing equipments for the pneumatic control of valves and cooler dampers, such as air compressor, air pressure vessel, piping, etc. shall be removed. It is important that the air pressure vessel is removed very quickly as it otherwise will be in conflict with the piping to and from pole 2 to the new cooler 4.

In Adelanto, the existing pneumatic equipments for coolers 1, 2 and 3 shall be exchanged to electrically controlled equipment provided by the Baltimore Air Coil (BAC) company. If the Customer accepts to operate the coolers with the fan louvers fully open and without system control for a limited time, then this exchange can probably be done before the main outage.

4.3.2 Modification of headers

The new coolers 1, 2 and 3 and its 3-way valves shall use the old pipe connections. The new 4th cooler and its 3-way valve shall have new connections. The end caps of the two headers shall be removed and the headers shall be extended including the new pipe connections for the 4th cooler and its 3.way valve.



Pipings for cooler 3 and 4

3-way valve of cooler 3 old inlet from header

3-way valve of cooler 4 using new inlet from header

ABB recommends prefabricating new parts for the headers with the new connections. During the outage, only the present headers need to be cut and weld flanges on the cut pipes to fit the prefabricated header parts. An alternative is to modify the present headers during the outage. However, this may involve unexpected risks due to problems with the existing piping, etc. which can jeopardize the time schedule.

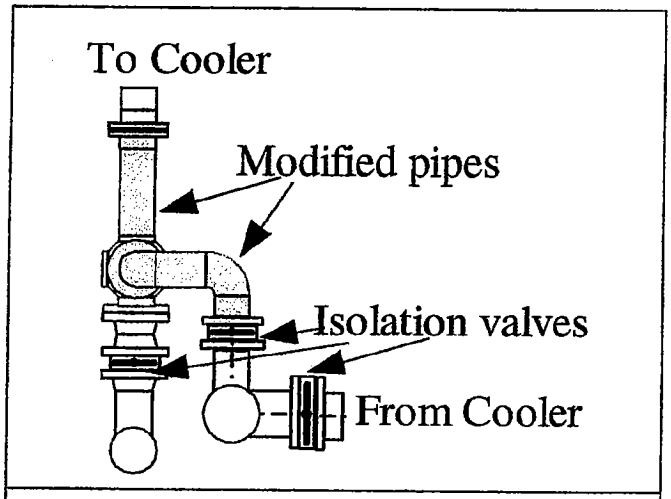
4.3.3 Exchange of 3-way valves

The existing "plug" type valves shall be exchanged to new 3-way ball valves. The new 3-way valves are controlled by electrical torque motors. The existing pneumatic system used for controlling the existing valves shall be removed.

4.3.4 Modified piping around 3-way valves of cooler 1, 2 and 3

The new 3-way ball valves are slightly larger compared with the existing 3-way plug valves. The connections to the valve have to be modified. The incoming pipe from headed shall remain unchanged. The outgoing two flanges will be at higher elevations and slightly separated compare with the existing flanges. The piping

shall be modified in accordance with the applicable drawings to fit the new valve. See figure below.

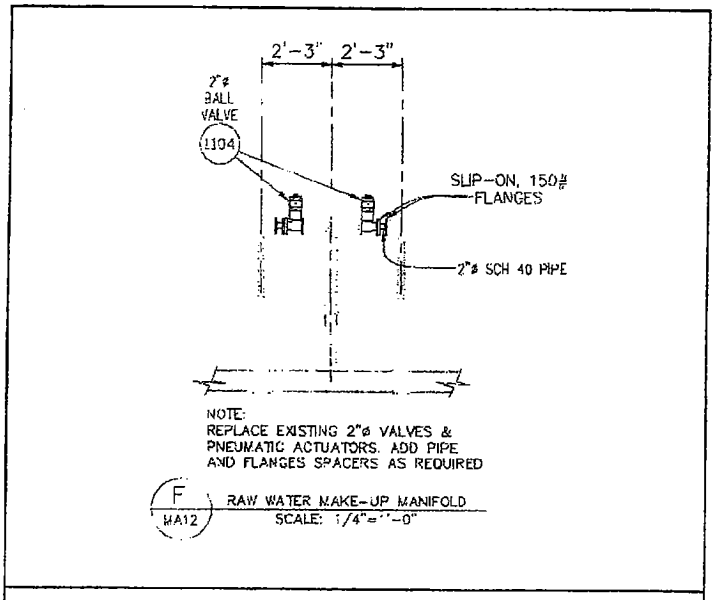


Piping change due to new 3-way valve

5 EXCHANGE OF MAKEUP VALVES

5.1 Installation during outage

The makeup valves can be exchanged during the potential short 2-3 day stop in May 2010. If not, then this work needs to be done during the pole outage. The makeup valves shall be exchanged during the main outage. The work is relatively minor, just exchanged the two (2) old 2" 2-way pneumatically controlled valves with new electrically controlled 2" ball valves. The distance between flanges is about 100 mm shorter for the new valves compare with the old ones. The connecting 2" piping has to be adjusted for this.



Piping change due to new 3-way valve

6 INSTALLATION OF RAW WATER FLOW METER

6.1 Installation during operation

One flow meter shall be added to each pole. This is an "Optisonic" flow meter aimed to be installed outside a pipe. In the piping basement below the valve cooling room there are suitable straight pipes for installation of these flow meters. The sensor shall be clamped on the pipe by wraps, connected to electronic controls installed nearby and calibrated per the manufacturer's instructions.

The exact position of these new raw water flow meters will be advised later and will also be depicted in the "For Construction" drawings.

7 Tests

After systems have been filled the new pipe installations shall be pressure and leak tested according to ASME piping standards. This is to be coordinated with site operations personnel.

Upon completion and acceptance of final pressure testing, the final welds can be made to secure the pipe clamps to the pipe supports. The repair and replacement of final piping insulation to match existing can proceed

8 System Flush

After system testing is complete consult with site operations personnel to coordinate for system flush of the Fine Water and Raw Water systems prior to start-up.

ASEA TRANSMISSION

INTERMOUNTAIN POWER PROJECT

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Instruction book No: VACO 1

Tab No: 1 - Cooling Towers

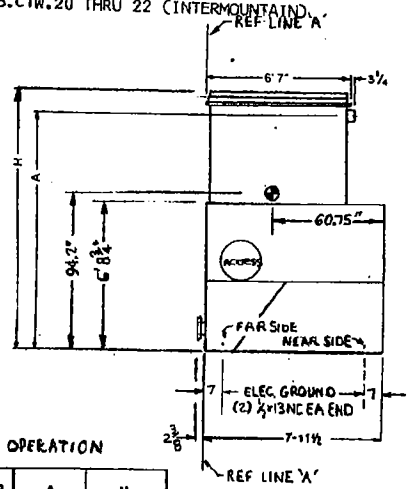
Revision No: 0

Issued: 84-11-13

Type of document	Document No	Rev.
1. GENERAL DOCUMENTS		
Manufacturer Designation:		
Cooling Towers: VXT-N265RC		
Motor: 25 HP, 1800 rpm, type TEFC, frame 284T		
Special Features:		
Baltibond corrosion protection		
Pneumatic dampers		
Double drift eliminators		
Motor space heater		
1.11 Layout Drawing	VR 4507A	5
1.12 Data Sheet	VXT-N265RC	8.15.8
1.13 Pneumatic Piston Actuator	D3153	11.8
1.14 Pneumatic Positioner	D9502	4734
1.15 Electro-Pneumatic Transducer	N6810	03.8
1.16 Motor - Dimensions	Section 205, Page 16	
1.17 Motor - Engineering Data	Section 204, Page 7	

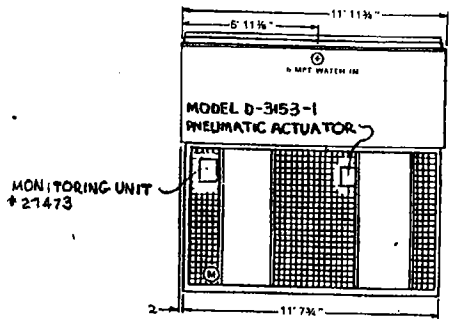
EQUIPMENT NUMBERS:
P1CB.CTW.10 THRU 12 & P2CB.CTW.10 THRU 12 (ADELANTO)
P1CB.CTW.20 THRU 22 & P2CB.CTW.20 THRU 22 (INTERMOUNTAIN)

NO.	REVISION	DATE
1	ADD DRAIN SIZE, DIMS, MTG.	5/21/84
2	Remote Sump DRAIN WAS 10"	6/7/84
3	DRAIN BACK TO 10"; ADD FLANGE	6/[illegible]/84
	ADD BOLT DOWN HOLES	
4	ADD GND CONNS, ACTUATOR, MONITOR, NOTE 3, & EQPT.	8/13/84
	NO. S	
5	ADD CG, ANCHOR BOLT & NOTE # 4	10/5/84
	REV MTG DETAIL, NOTES 1 & 3,	
	& ELEC GROUND LOC.	

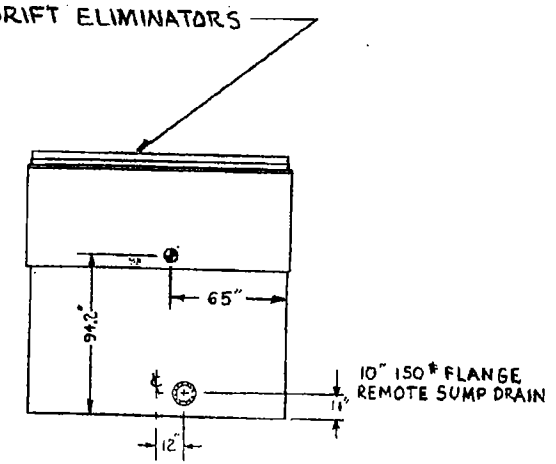


Ⓜ Fan motor location.
⊕ CENTER OF GRAVITY DURING OPERATION

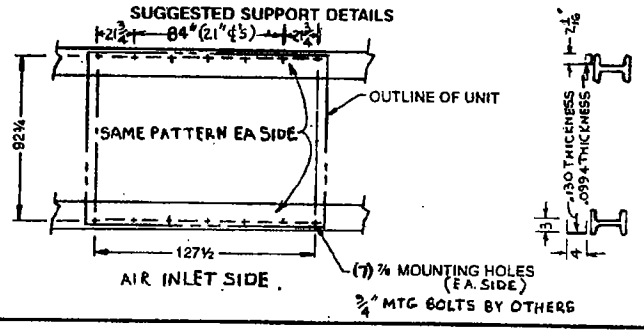
MODEL NO.	APPROX. SHIPPING WEIGHT	APPROX. OPERATING WEIGHT	A	H
~~VXT-N2J8~~	~~4640~~	~~6810~~	~~9'-8¼"~~	~~10'-6¾"~~
~~VXT-N24C~~	~~5090~~	~~6560~~	~~10'-2¼"~~	~~11'-6¾"~~
VXT N288 RC	6100	7600	12'-3¼"	13'-4¾"



2 SETS OF DRIFT ELIMINATORS



SUGGESTED SUPPORT DETAILS



NOTES:
1. The recommended support arrangement for VX units consists of two parallel I-beams extending the full length of the unit. Supports and anchor bolts are to be designed and furnished by others
2. All supporting beams are to be flush and level at top and must be oriented relative to gage line as shown
3. Recommended design loads for each beam should be 70% of the total unit operating weight applied as a uniform load to each beam. Beams should be designed in accordance with standard structural practice. The maximum allowable deflection of beams under the unit shall be 3/8 of an inch.
4. All mounting holes are 7/8 inch dia at the locations shown.
5. If vibration isolators are used, a rail or channel must be provided between the unit and the isolators to provide continuous unit support. Additionally the support beams must be designed to accommodate the overall length and mounting hole location of the isolators which may differ from those of the unit. Refer to vibration isolator drawings for these data.

NOTES: 1. All dimensions are in feet and inches (except C.G.). Weights are in pounds.
2. Unless otherwise indicated, all connections 6 inches and smaller are MPT.
3. Construction complies with calculations and recommendations made in Agbabian Associates Report R-8434-5745.
4. The unit is designed to withstand .5g horizontal and .4g vertical ground accelerations.

B.A.C. 83-7350/1/2/3/4/5 ORDER NO. 6/7/8/9/60/1M DATE 4/26/84	**BALTIMORE AIRCOIL** AFFILIATE OF MERCK & CO., INC	COOLING TOWER DWG. NO. VR 4507 A

BALTIMORE AIR[illegible]L COMPANY, INC.
SUBSIDIARY OF MERCK & CO., INC.

Revised 8/15/84
Revised 5/21/84

DATE: April 26, 1984
CUSTOMER: ASEA, Inc.
873 North West Grant Avenue
Corvallis, OR

P.O. NO. 7103.2595
B.A.C. NO. 83-7356/7/8/9/60/1M
MODEL NO. (6)VXT-N265RC
REFERENCE NO.
P1CB.CTW.20 THRU 22 &
P2CB.CTW.20 THRU 22

PROJECT: ASEA Project-HVDC - Millard, Utah
ENGINEER: Ch2 m Hill - Corvallis, OR
B.A.C. REP.: G. J. Campbell & Associates - Portland, OR

VX COOLING TOWER

CERTIFIED CAPACITY: 675 gpm of water from 97.8 °F to 84.4 °F at 73 °F entering wet bulb and 2.1 psig spray pressure

FAN MOTOR(S): (1) 25 HP, 1800 RPM, 3 phase, 60 hertz, 460 volts, TEFC High-efficiency w/space Htr enclosure. Drives based on 0" ESP.

Submittal Data: 12 copies ☒ For Approval ☐ For Record

ITEM	DWG NO.
☒ Unit dimensions and support data	VR4507A
☒ Specifications	
☒ Remote sump connection, less float valve and strainer	
☐ Bottom outlet connection	
☒ Fan discharge dampers	
☐ Elec. damper controls volts	
☐ Electric water level controls	
☐ Package ☐ Switch only	
☐ Electric pan htrs., ( ) KW, V, PH, HZ, model	
+ 40°F pan water at °F ambient	
X Duct Connections	BAC6444A
X Seismic Accessory package	
X Extra set of drift eliminators	

ITEM	DWG NO.
☐ Steam/Hot water coil + 40°F pan water at °F ambient	
☐ Aluminum ladder ☐ Safety cage	
☐ Safety railing	
☐ Sound attenuation	
☐ Discharge ☐ Inlet	
☐ Discharge hood	
☐ Solid bottom panels	
☐ Bottom screens	
☐ Extended lube lines	
☐ PVC eliminators	
☐ Vibration isolation rails	
☐ Epoxy coated fan wheels	
X BALTIBOND[R] Corrosion Protection System	
X PENN D-3153-1 Pneumatic Actuator	
X Bently Nevada 27473 Monitoring Unit	

FOR FACTORY USE ONLY

X 12/29/83

10-12

Sabol & Rice
801-973-[illegible]

(6) Parts Lists & Operation/Maintenance Manuals

P.O. BOX 7322 BALTIMORE, MARYLAND 21227 USA / TELEPHONE (301) 799-1300 / CABLE BALAIRCOIL / TELEX: 087821 BALAIRCOIL BAL
P.O. BOX 960 MADERA, CALIFORNIA 93639 USA / TELEPHONE (209) 673-9231 / TELEX: 035-5459 BALAIRCOL MDRA
R.R. #2, BOX 7 PAXTON, ILLINOIS 60957 USA / TELEPHONE (217) 379-2311 / TELEX: 404441 BALAIRCOL PAXT

ENGINEER COPY [illegible]

Type of document	Document No	Rev.

2. TRANSPORT, RECEIVING AND STORAGE DOCUMENTS

Manufacturer Designation:
Cooling Towers: VXT-N265RC
Motor: 25 HP, 1800 rpm, type TEFC, frame 284T

Special Features:
Baltibond corrosion protection
Pneumatic dampers
Double drift eliminators
Motor space heater

Unloading and Handling Instruction — See document 4.31, Subtab 3

Type of document	Document No	Rev.
3. INSTALLATION DOCUMENTS		
Manufacturer Designation: Cooling Towers: VXT-N265RC Motor: 25 HP, 1800 rpm, type TEFC, frame 284T		
Special Features: Baltibond corrosion protection Pneumatic dampers Double drift eliminators Motor space heater		
1.31 Rigging and Installation Instruction	R308/1-0	11/83
1.32 Mounting Detail	8/17/84	
1.33 Erection Check List		